LIQUEFIED METAL JET PROGRAM
AUTOMATION AND ROBOTICS RESEARCH INSTITUTE (ARRI)

R&D QUARTERLY STATUS REPORT

REPORTING PERIOD: 15 April 1995 THROUGH 15 July 1995

Sponsored by:

Advanced Research Projects Agency (ARPA)
Contract Management Office (CMO)
Liquefied Metal Jet Program (LMJP)

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LIQUIFIED METAL JET PROGRAM (LMJP)

AUTOMATION AND ROBOTICS RESEARCH INSTITUTE (ARRI)

R&D QUARTERLY STATUS REPORT

DATA ITEM 0002AA

15 APRIL 1995 THROUGH 15 JULY 1995

1.0 INTRODUCTION

This report covers the period from 15 April 1995 through 15 July 1995. The Quarterly Technical Reports are organized by the statement of work (SOW) listed in section 5.0 of the proposal. These are listed as follows:

- Reports and demonstration.
- Equipment.
- System test and experimentation.
- Test coupon evaluation.
- Technology transfer.

Technical problems associated with the nozzle design and fabrication have been solved. A new jeweled orifice plate supplier has been located and orifices have been successfully procured and tested. The nozzle sealing problem has also been resolved and over 50 nozzles have been assembled with no leaks. The remaining problem to be solved is believed to be casued by particulates in the solder. Improved filtering methods have been developed and are currently in test. System testing with the new nozzle design and micro filtered solder is expected to resume operations in mid July. Final fabrication and assembly of the copper system is expected to be complete by mid August.

2.0 PROGRESS DURING THE REPORTING PERIOD

- Identified and incorporated improvements for nolead system reliability including a nozzle redesign, new orifice vendor, and assembling nozzles in house.
- Identified and designed several methods of filtering solder for evaluation
- Completed design and started fabrication of copper system.
- Began assembly of copper system fluidizer pressure vessel.
- Resolved XY table issues with custom designed and fabricated hardware/software. This eliminated the need of purchasing a new table and thus saving the project of at least $20,000.
- Completed design and order placement for copper system fluidizer containment vessel and silicon carbide heater elements.

Improvements on miniaturization of the deflection system were completed and successfully tested.

3.0 PLANNED ACTIVITIES FOR NEXT REPORTING PERIOD

- Demonstrate resolution of particulate problem
- Demonstrate PWB fabrication capability
- Produce solder coupons for evaluation
- Demonstrate proper copper droplet formation

4.0 EQUIPMENT PURCHASE OR CONSTRUCTED

Assembled/Constructed:

- Completed nolead system modifications to reduce intermetallic contamination.
- Constructed filtration system to filter particulates from solder.
- Began manufacturing copper system.
- Constructed and tested 16 new nozzle assemblies

Purchased:

- None

5.0 NOTIFICATION OF KEY PERSONNEL CHANGES

None

6.0 INFORMATION FROM TRIPS, MEETINGS, AND SPECIAL CONFERENCES

Meetings with MicroFab to discuss future cooperative efforts. Attended NEPCON 95 conference in Anaheim, Ca. Held program review of this project at ARPA offices in Washington D.C.

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11. Supplementary Notes

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13. Abstract (Maximum 200 words)

This report covers the period from 15 April 1995 through 15 July 1995. Substantial progress was made this quarter. The nozzle and nozzle sealing problems were resolved. The x-y table was modified to improve its performance.

14. Subject Terms
Liquefied Metal Jet (LMJ)

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